

METHOD FOR COMBINED AIR AND  
LIQUID COOLING OF STACKED ELECTRONICS COMPONENTS

ABSTRACT OF THE DISCLOSURE

An enclosure apparatus provides for combined air and liquid cooling of rack mounted stacked electronic components. A heat exchanger is mounted on the side of the stacked electronics and air flows side to side within the enclosure, impelled by air-moving devices mounted behind the electronics. Auxiliary air-moving devices may be mounted within the enclosure to increase the air flow. In an alternative embodiment, air-to-liquid heat exchangers are provided across the front and back of the enclosure, and a closed air flow loop is created by a converging supply plenum, electronics drawers through which air is directed by air-moving devices, diverging return plenum, and a connecting duct in the bottom. In a variant of this embodiment, connecting ducts are in both top and bottom, and supply and return ducts are doubly convergent and doubly divergent, respectively. Auxiliary blowers may be added to increase total system air flow. The enclosure also may be provided with automatically opening vent panels to allow room air to circulate and cool in the event of an over-temperature condition. The design of the enclosure permits it to be constructed apart from the rack-mounted apparatus and subsequently attached to the rack, if desired, at the facility at which the rack had been previously operating.